

AVIATION WEEK

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FEB. 13, 1950



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Aviation Week

Volume 52

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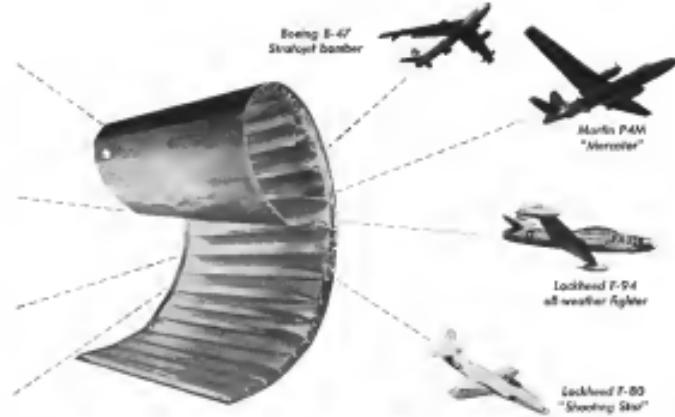
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NEWS SIDELIGHTS

Small Business Buying

Navy and Air Force are fighting legal battles regarding their right to give "fair and unobstructed portions" of present and future contracts at small business firms employing less than 500.

They claim it would shield an unpossible administrative burden on them to carry out the policy. The three contractors on which the suit was filed by Rep. Wright Patman (D., Tex.) which prompted the legislation, clarified their position in an recent report.

Patman has long claimed that the armed services are becoming monopoly through favoritism to huge concerns in contract letting.

Tactical Air Center

Establishment of Joint Airborne Center at Ft. Bragg, N.C., this week is the culmination of years of effort Army Gen. Jacob L. Devers' complaint that USAF has been paying top lip service to tactical air support of ground troops.

Center will be under jurisdiction of the chief of Army Field Forces and will have three major departments: flight airborne, doctrine, tactics and techniques; pilot advanced training; and procurement, evaluation and testing of airborne equipment.

Maj. Gen. Wilson M. Miles, commanding general of the 11th Airborne Division will head the review. His first big job will be evaluation of the Ninth Air Force H-43C being modified specifically by USAF in a technical support weapon.

For foreseeable future, USAF will continue to buy the method of support planes at Air Materiel Command but personally will be expected to pay more attention to AFM representatives than in the past.

Security Problem

Pentagon visitors protest from early this month, Defense Secretary Johnson has sanctioned a series of security clearances with which a contractor would have to comply before performing classified intelligence.

Wardlaw previously indicated that a contractor would be forced to submit a contract containing classified information if he had an employee who could not be given a security clearance. Revised rulings now provide that only those employees whose work will require access to classified material need be screened and approved. A denial of security clearance

Arnold Tribute

As a tribute to the late Air Force leader, Gen. Hoyt V. Arnold, Sen. Lyndon Johnson (D., Tex.) has proposed USAF's Air Engineering Development Center be named "Arnold Engineering Development Center."

He has introduced a resolution, now pending before the Senate Armed Services Committee, to amend a proposal that USAF has 150 million to move forward with the project year. It is being debated in the House Post Office and Merchant Marine Committees.

The President has stipulated that no

raise of his unmeasurable contribution to the Democratic cause is destined at the party's fund-raising committee in the last election.

Tox Reduction

Secretary of Treasury John Snyder finally put the administration behind elimination of the 3 percent surcharge on transportation of passenger tax from 15 percent to 12 percent on interstate federal, state and local governments.

The President has stipulated that no

raise can be coupled with increases in either his categories to make up for the revenue loss.

Lightplane Prototypes

National Aviation Thaddeus Axe is expected to support legislation authorizing \$5 million for lightplane development over a three year period, sponsored by the National Association of State Aviation Officials. Testified by Sen. Edwin Johnson (D.), of NASAO's executive council, the measure will set up a National Civil Aviation Council, an organization which will coordinate, at headquarters in New York, and subordinate Civil Aviation Administrators to expand funds for their development.

The cockpit for the proposal in Congress, where more interest is seen in proceeding development of lightplane cargo types with a nose sheet skin in surface defense, is due, especially since the proposal does not have wholehearted industry support.

The old question of establishing another federal civil agency to handle air marine affairs, and the question of federal funds vs. state enterprise are once again in the bill just as they have been in the prototype discussions.

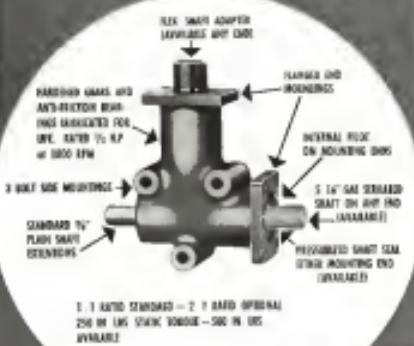
Tunnel Development

President Johnson has requested a \$20 million supplemental budget for National Advisory Committee on Aviation to move forward with wind tunnel development.

The request was for \$1 million plus and \$1.5 million contract authorities, and would be allocated \$15.5 million for construction of small supersonic tunnels at universities, \$6.6 million for testing construction of a large supersonic tunnel at Ames Aerodynamics Laboratory, and \$500,000 for the damage and purchase of lead (600) used at the Langley Aeracoustical Laboratory.

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AVIATION CALENDAR

Feb. 14-15—Annual convention, Flight Engineers International Assoc., Forest Hills Inn, New York City, N.Y.

Feb. 18-20—National Sportscasters Show, Hotel Plaza, New York, N.Y.

Feb. 27-Mar. 1—Annual meeting, American Society for Testing Materials, Hotel Wilshire, Los Angeles, Calif.

Mar. 1-2—Louisiana Aviation Conference, Washington Inn, Hotel, Shreveport, La. Floyd J. Royal, Shreveport Chamber of Commerce.

Mar. 3-5—1957 Annual convention on aviation and airport fire protection, Hotel Statler, Indianapolis.

Mar. 6-8—Sixth annual South Japan non-scheduled operations meeting and second annual aircraft maintenance conference, Hotel Tropic, Fort Worth.

Mar. 6-9—7th annual meeting, American Road Builders Assn., National Plaza Hotel, Cincinnati.

Mar. 6-9—Annual convention, Institute of Radio Engineers, Hotel Commodore, New York City.

Mar. 24-26—Field annual flight propaganda meeting, sponsored by the Institute of the Aerospace Sciences, Curtis Hotel, Cleveland.

Mar. 26-31—National Photo Exposition, Hotel Statler, New York City, N.Y.

Mar. 30—Hobkirk annual Helicopter Show, sponsored by the American Helicopter Society and the Institute of the Aerospace Sciences, Ben Franklin Hotel, Philadelphia.

Apr. 4-6—Engineering and Maintenance conference, Air Transport Assn., Hotel Central Park, Kansas City.

Apr. 4-8—National Aviation Exposition, sponsored by the Chicago Technical Society Council, Stevens Hotel, Chicago.

Apr. 10-12—Annual meeting, American Society of Lubrication Engineers, Hotel Statler, Detroit.

Apr. 26-28—Annual business meeting, American Ass'n of Airport Executives, Neil Hospital, Columbus, Ohio.

Apr. 27-29—1957 Annual meeting, Society of Automotive Engineers, Hotel Statler, New York City.

Apr. 28-29—Aircraft Operators Council, Hotel Cavalier, Detroit, Michigan.

May 5-6—Annual meeting, American Society of the Aerospace Professional, Ford Products division, University of Illinois, Urbana.

June 3-10—National Association Ass'n, in 30th convention, Hotel Statler, St. Louis, Mo.

June 25-28—Navy-Mars 1950 convention, Ft. Clark Guest Ranch, Brackettville, Tex.

June 25-28—51st annual meeting, American Society for Testing Materials, with a short list of invited speakers and related meetings, Chalfonte-Haddon Hall, Atlantic City, N.J.

July 30-Aug. 1—17th National Scouting Convener, Crystal City Inn, Washington, D.C.

PICTURE CREDITS

11—Courtesy of 20th Century Fox Film Corp.; 12—Courtesy of United Artists; 13—Courtesy of Columbia Pictures World News.

NEWS DIGEST

PO Questions Need

For NY Copter Plan

First Civil Aeronautics Board hearing on a helicopter route application for carriage of passengers as well as mail opened last week in New York with the U.S. Post Office Department lined up against the Defense Department and against the Federal Department and business and civic groups of New York City.

The Post Office for many years has been opposed to helicopter mail service in the New York area, but the depth of its opposition was only disclosed last week with Paul Atlas, associate director of communications, firmly advocating a departmental policy statement against the proposed service.

Post-On—the other side, statements of Stephen T. Early, radio-instructor at defense, and a representative of the Army, Navy and Air Force strongly urged the service as a national need.

The Post of New York Authority went to the unusual length of amending its Post of New York Authority to advise the Post Office Commission to advance the development of military heliports.

The City of New York, through its acting mayor and various municipalities and business organizations of the area, endorsed the proposed service. Taylor cited aviation statistics which the city had used to support its application at the New York heliport case exceeded that of one other CAF route proposed.

In case the Post Office Department were to insist, Alan's May statement disclosed that if the service should be authorized, the department would run its own heliports as to whether it will tender bids to the operators—a new and legally doubtful question.

The Post Office claimed it could probably by track equipment services from a three angle at least twice to one third the cost subparagraph for the helicopter mail service from outlying points to New York City. Mail power was that the charter service would require new and special handling and facilities. This argument was disputed by a Post At-

to-Copter service which would require new and special handling and facilities. This argument was disputed by a Post At-

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DOMESTIC

North American Aviation's T-33 selected fighter has completed Air Force Phase One flight and ground tests and has begun Phase Two. The first Education ATD, 52-104, NACA paint has just more than 50 flight hours on the transom.

Señor K. Wolf has been appointed

executive director of the electronics division of the Manhatten Board. He has been manager of the special products

division of the Federal Telephone and

Radio Corp.

Manufacture Aircraft Assn. has elected William E. Hall president. The association, which advances coach-carrying passenger agreements in the aircraft industry, received 174 patents since 1946, and is currently advancing a departmental policy statement against the proposed service.

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Aggregation of \$7 million has been raised for the Tennessee Valley Authority so it can start work by July 1 on a second new atomic electric generating plant to help meet future needs of west and south of the new Alvin G. Trammell Generating Station at Tellico, Tennessee.

Cougar Tire and Rubber Co. will not expand 1958 tire output at this year's National Auto Show, the company announced last week. It said it had originally agreed to increase the 1958 output at Cougars' Traylor plant for only three years and that period has expired.

FINANCIAL

Koppen Co., Inc., Johns metal products division, announced January 20, 1957, that 1956 sales of \$141,156,441 and net earnings after taxes were for another year, of \$7,311,977.

INTERNATIONAL

British Gromex Airways Corp., will begin service with Canadian Far East ports on its London-Singapore, China, Feb. 26. The British Air Services logo emblem of the route has not been operated since withdrawal of the Tudor in January, 1949. The Condor Flair will replace Tudor on the Atlantic part of the route.

British Air exports for 1949 totaled nearly \$91 million, with air imports aggregated to about \$90 million. The export figure was almost \$3 million greater than had been forecast.

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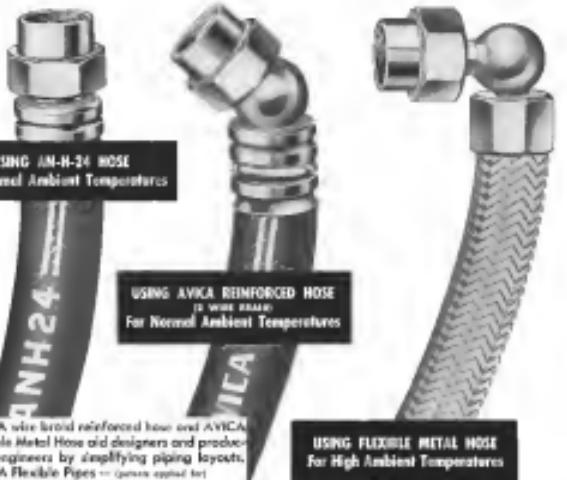
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WHO'S WHERE

Changes

► **Alta. Helicopter Airlines** has put M. G. "Doc" Brink, director of flight operations, into his Littlehempstead office as vice-president while Lieutenant in command, N. Mac, on several months leave at altitude, ALA expects him back around April, director reported that he will return. Robert E. Ayer, formerly manager of maintenance division of flight engineering of American, for the time being, the post will not be filled. Ayer, an expert on aircraft engine problems and one of the leading experts on aircraft safety, had been with American since 1944. Ayer intends to remain in service, however, and announced his future plans shortly.

► New **Aerospace-Snugtop**, Aircraft, Inc., named J. W. Hinchliffe director of research. His successor, C. C. Knous, remains in charge of design, research and development. Col. George H. Howard Vogel is new director of engineering at Champaign Spruce Corp. He succeeds a Ray Fenton. Carl Antonsson, board president, S. Thomas Ritter to assume chief engineer in charge of the safety and quality producing division of the company. Howard Vogel, his successor, Morris A. Antonsson, has recently resigned to join the Aircraft Owners and Pilots Assn.

J. Gooday Notman is now executive vp of Comair, Ltd., Montreal, Quebec. Comair's largest shareholder, Ernest Ferry A. Johnson, executive vp and general manager. Jim H. Abbott has been named an assistant director for research at NASA Langley Research Center. Robert L. Johnson is now assistant chief engineer of Precision Products, Inc., Newark, N.J. Robert L. Johnson, president, Wilson & Kestrel, chief of product eng'g serving, E. & T. Times it more than a month and charge of the company.

► **Pabco** Form-Magnetic Multicells has joined Northwest Airlines' publicity and public relations department. In Fred Brouillet, formerly with Powers, has replaced Mrs. Martha Leonard Zekel previously named art director.

► **Salem Shirts-Fineknit**, Adams, has left Latin America to join AirResearch Manufacturing Co., Los Angeles, Calif. John W. B. Bremner, formerly Delta sales manager for Wilford Stough Billing Co., a now California district unit manager, in Tulsa is N. G. Wolf. George L. Steele, a central regional sales manager for Pan Am, has left Latin America.

► **Bellanca-John H. Brumagh**, assistant chief engineer of General Motors New Dearborn division, retired last month.

Elections and Honors

Eric Cook, Co. Milwaukee, has elected Douglas B. Wadsworth, chairman of the Association of Metal Fabricators, Ohio affiliate to its board of directors. R. E. Hartman, president of Huron Locomotive Co. L. T. Keeney, United Webbing Co., R. S. Westerman, Ogallala Service, Inc., E. J. Myers, Newsprint, Inc., Edgar Stebbins, Memphis, Tenn.

INDUSTRY OBSERVER

► Long-standing opposition to overhead baggage racks for aircraft is expected to be overcome by American Airlines, which AA has asked CAB permission to modify the racks so passengers can stow small luggage there, with webbing to keep luggage from falling and hitting passengers.

► First flight of the first U.S.-built multi-engine turboprop plane is scheduled next week at San Diego. The big Navy flying boat, Convair's XPY-1, powered with four Allison T-50 turboprop engines, rated at 1,580-shaft hp each, is designed for long-range search missions.

► Wingtip tanks, interchangeable with detachable wingtip fuel tanks, is new armament which soon to be tried out. First designs are expected to be ready for USAF flight tests late this year. Max is to add more dispensers for less weight, and improved sighting coverage. Clearing flightdeck space of现有 tanks makes room for fuel or other equipment.

► Aerospace Affairs will conduct an evaluation soon between the Sperry Zone Resolvers and a Collins Radio Co. device designed to serve the same purpose, with flight test to be run in AA's cargo DC-4s. Besides Edgerton-Prescott Instrument division also is developing its own device as a zero-Kerosene competitor.

► Boeing-Wichita was to complete its first Wedgetail 847 bomber Feb. 14. Five other hand-tooled Stratogots are following. Then, larger production will get underway. Tooling for large production lot items is in preparation for several months. Meanwhile, the Wichita plant has passed its original employment estimates from a peak of 11,000 by June 3, to 10,500 at the same date, new set in the new peak occurs additional work is assigned at Wichita.

► Midair refueling methods currently being tested by USAF and Navy are reported as unsatisfactory because of slowness of transfers and slow operating speeds required during transfers. From strategic point of view a fuel transfer rate of 650 gpm, at operating speeds of around 500 mph, is sought and little else of this will be acceptable for quantity equipment contracts.

► Convair Aircraft Co. has a current production schedule of 13 transports a week, on its 335 model with 525 persons employed in its aircraft division.

► A series and engineering meeting of representatives of CAB and the personal aircraft manufacturers, scheduled for Feb. 13-14 in Kansas City, is reported to be the first in a series of annual conferences similar to the airline maintenance conference. Representation of distributor and lightplane operators is expected at subsequent meetings.

► Responses to an AIA survey of personal plane manufacturers and operators indicates that flashing position lights are feasible for personal plane installations are considered unsatisfactory and too expensive. Canadair are being forwarded to CAB which is considering a new position light requirement for planes weighing less than 12,500 lb, and to CAA which is preparing a technical standard for lighting light test.

► Avia Canada is preparing to make first test flights with its new Omega transponder installed in outer fairings of a Lancaster bomber flying test bed.

► Canadian government's expenditure of \$50 million on aircraft, 40 percent of which is for jet planes, places that country fourth or fifth in the world in military aircraft expenditures. Defense Minister Bertrand Courtois stated recently.



T-38 ENGINES will give the ConvairLiner longer distance, less fuel, less weight, greater speed and more payload.

First U. S. Turboprop Transport Near

General Motors to finance installation of T-38 engines in Convair due to fly in June.

By Alexander McCarry

General Motors Corp. last week announced its big bankroll and moved with catalytic effect toward the ultimate U. S. jet transport prototype position, as a result, the first American turboprop transport plane will be flying in January—a cargo version Convair Lancer converted from a passenger plane to use Allison's T-38 turbofan engines developing 2710 horsepower each shaft and turning new design three-blade Aero products propellers.

Spurred on by the immature GM-Cessna program, estimated around \$1.5 million, are expected to have a strong effect in getting other American transport plane makers to go into active Lockheed, Douglas, Boeing and Martin are all known to have jet transport designs on the drawing boards. It is probable that one or more of these will be selected for actual prototype construction.

In very soon, if some are not already started.

► **Convair Constellation**—The two General Motors divisions, Allison and Avco, will bear the principal responsibilities of the GM-Convair program, and turn over the engines and propellers and engine controls. The larger engine division of the GM group, Avco, has undertaken the responsibility for the peripheral conversion, which is estimated at around \$200,000. Standard practice for a Convair Lancer is \$495,000.

Effect of the turboprop transport program on the government sponsorship of new transport prototypes is not yet clear. An "agreement" Convair's proposed for a flight testing program for prototypes, favored by government, after the prototypes were built by industry could fit the Allison-Convair plan into its schedule very nicely. The ACC proposal however has yet been approved by President Johnson's Budget

Bureau and is expected to be forwarded and returned for a second Budget examination within a few weeks.

► **Certification**—CASA expects to certify the turboprop Intastart at San Diego under both Regon CAA technical rules, but anticipates that Allison will have confirmed the T-38 configuration before the airplane flies. The engine manufacturer has not yet made final application for engine certification, but has already discussed it thoroughly with CASA.

The engine will be delivered to Allison's test facility for number running procedures after which it will be used for demonstration to other aircraft manufacturers, military services and so forth. It is expected that the airplane will be turned to civilians for major test and operations over their own routes.

► **Top Level**—Negotiations in the GM-Convair deal reportedly went to the top level in both organizations, including participation by Almond P. Shultz chairman of the GM board and Floyd B. Olson chairman of the Convair board. Convair saw the arrangement as a good bargain for both parties. Some of

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the other aerospace nations were friendly versions of Convair. The defense company had not only managed to get another company to bear the main expense of testing a new transport version of its transport but had sold its upstream business.

► **Newell Statement**—Well aware of the delicacy of the highly competitive transport airplane situation and of the fact that Convair's competitors are also potential customers of Allison and Avco products, E. B. Newell, Allison general manager and GM vice president, pointed out that the Convair plane was selected based on a requirement for a two-engine transport which could be modified for turboprops in the future time and at minimum cost.

The ConvairLiner has more than an aspirational appearance since it may enter U. S. postwar twin-engine transport and thus offers the best opportunity for comparison of operations with piston and turboprop engines.

► **Available Data**—Newell also pointed out that the engineering data on the conversion and testing would be available promptly to other plane manufacturers.

He stated that the ConvairLiner was originally designed specifically to take the higher speeds of turboprop operation and for simple conversion from piston to turboprop engines.

In most advantageous position to use such information is Douglas, whose postwar four-engine DC-6 is powered with four of the same Pratt and Whitney R-2800 engines used in the ConvairLiner. Presently the conversion of the DC-6 standard aircraft and its problems lead to that in the ConvairLiner.

► **Martin Prepped**—Glenn L. Martin Co. no longer is producing its DC-2/DC-3 two-engine transport, might possibly consider a T-38 conversion in 2-1/2 to seven, and probably will study the turboprop installation as an alternate powerplant for its new projected 404-seat engine transport which it is negotiating to sell to Eastern Airlines.

The engine manufacturer has made preliminary engineering studies and other advantages of the T-38 as its double-removal of the T-40, as a concern in the field of the power plant, including, besides those mentioned, the Lockheed Corporation, the Boeing Stratocruiser and the Douglas C-124A military cargo plane.

► **Weight Advantage**—An appreciable weight advantage with the turboprop installation coupled with smaller diameter nacelle and resultant less drag on obvious advantages at the conversion. The 2750-hp. T-38 weighs only 1225 lb. and a weight saving of approximately 2000 lb. is expected in the ConvairLiner by replacement of the 2400-hp Pratt & Whitney engine. This is the equivalent of more than 10 passengers and luggage of standard airline figures or 530 additional gallons of fuel.

Convair is trying hard to fit the 2750-hp engine usually quoted for the jet-

engine ConvairLiner may be as much as 18 to 40 mph. It is expected, while lighter takeoff and landing power will permit operations at higher gross weights than are now possible.

► **Structures Problem**—Convair and certificates will entail some structural investigations of the airframe, particularly control surfaces and wings, because of the higher performance with the turboprop engines.

Effect of the turboprop conversion on the postwar engine ConvairLiner is an infinite series in another aspect under consideration. Convair engineers expect the airframe will later be able to provide a more powerful engine, including, besides those mentioned, the Lockheed Corporation, the Boeing Stratocruiser and the Douglas C-124A military cargo plane.

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Cohu Predicts

Convair President John W. Cohu, Jr., recently predicted that "Bingo" at the 40 manager ConvairLiner is a relatively short time can be convened in turboprop transports, as a result of the Allison T-38 turboprop development program.

More than 150 pressurized Convair Liners are now being operated by 12 airlines and have flown over 1.1 billion passenger miles without a fatality, he pointed out, and are potentially far more dangerous.

Cohu said that the turboprop transport fits "handily" into today's "busier pattern" with other planes flying longer distances and fuel economy enabling the turboprop to "stack" at speeds it matched with other planes. "A performance which puts you first will be able to match."

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► **Weight Advantage**—Free-floated passenger comfort with the vibrationless power provided by the turboprop powerplant is expected to be a pastoral air lane factor in justifying the new powerplants for airline use.

Convair currently has a substantial lead in other ramifications of turbojet engines. Possible next roll is a Pratt & Whitney, where PTF-2 turbines are a much better jet engine and rated at about 5000 equivalent shaft horsepower.

Other turboprops under development in this country since World War II, but none of which are considered in immediately active competition, include the Curtis Wright T-33, currently being used to train the new CWB air crews at MacDill Air Force Base, Fla.; the Northrop turboprop, rated at 11,000 shaft hp., which was scheduled to be test flown in a special stabilization with a Northrop B-49 Flying Wing, the Grumman Electric TG-100, flown in the Convair XP-80, first American turboprop plane to fly, and a large Western liaison turboprop still in early development.

AF Sees F-84s As B-36 Parallels

An F-104 is planned "parrot" of two Bell Republic F-84 Thunderfighters under the wings of the Convair B-36 bombers. This upcoming round of the use of parasite fighters for the long hauls is a reversal of policy after the generic was discontinued as an active Air Force project on the basis of experience with the McDonnell XF-85 Goblin jet fighter.

The use of the F-84 instead especially on the B-10 offers a new approach to the problem of escort fighters for the 10,000-mile borders. The 550 mph F-84s can fly 10,000 miles without refueling, the F-104s can only refuel once, and the problem of maintaining extensive operational time and distance for parasite fighters. Fortunately short duration of the XF-85 (about 30 min.) severely restricted its combat usefulness.

► **Block Assailed**—Meeting the parasite fighters suspended from the B-36 aircraft completely avoids the major stumbling block in the sites to date: cramped dimensions of bomb bays. Requirement for internal storage of the XF-85 (about 30 min.) severely restricts its combat usefulness.

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Devising to reduce operational costs reduces the Air Force is still studying the tactical problems of sending on escort B-36 bombers over existing targets. Previous defense of such a mission was based more on economy than tactical necessity. No fighter in the world, now living or in future prospect, will ever have a 10,000-mile range with present propulsive. Therefore, the B-36 was assigned to unescorted missions by default of flight design.

► **"One Way" Missions**—Tough strategic

New Board Weighs Trainer Requirements

Concerned with inadequacy of present day military trainer aircraft, the Air Force and Baker will soon establish a Joint Requirements Board to study needs of both services for a new two-engine, turboprop, and to conduct evaluation of three single-engine trainers for fiscal 1975 procurement.

While North America has provided USAF-Navy with an interim single engine aircraft, the T-38, which could fill annual procurement requirements for seven joint-service aircraft, A. V. Ross Canada Ltd., told Aviation Week in his annual visit to the Canadian subsidiary of the Hawker-Siddeley group of Commonwealth aircraft companies.

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Ray stated the craft will sell for about \$300,000 Canadian, completely fitted for naval service as a 50-passenger transport. No orders have been received as yet for the smaller twin-engine transport companies or military services.

Canadian's CF-35A generally the same bill for Navy's land-based training purposes but similarly built another aircraft training characteristics are com-

pared. Working toward an overall joint procurement plan of training aircraft, the new board will be given with a re-evaluation comparison test between the Fairchild T-33, TEMCO T-35, and the Beech T-34.

Participants set out that the craft must be two-place, incorporate dual controls for primary and secondary training, capable of night and instrument flying, incorporate high-g maneuvering performance, have a range of more than 700 miles and a four-hour endurance.

Two Engine Specs—In the two-engine field, although complete design specifications have not been worked out, broad qualifications of the design competition to be announced by the board are that the plane feature side-by-side dual controls, a range over 1,200 miles and an endurance of six hours at maximum speed, provisions for all-weather flight, speed and weight characteristics which, through modifications, would enable the plane to be used in light cargo transport duty, or in training, navigation, electronic operations, flight engineers and gunners, in addition to its prime mission as an advanced pilot trainer.

Exclusions of the three single-engine

aircraft, and subsequent procurement of one will not interfere with USAF-Navy procurement commitments of current

types such as the T-38 and T-28, nor will it reduce current two-engine conversion or procurement programs.

Avro Jetliner Will Fly to U. K.

Craft, set to sell for about \$850,000, will be shown at SBAC show, then flown to Europe and South America.

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See Ray Dolby (center), managing director of both British and Canadian Avro companies, and president of the Society of British Aircraft Constructors, talks over the new Avro Jetliner (subsidy) with Waldo N. Dolby (left), general manager of the Canadian company.

AVIATION WEEK, February 13, 1969

PRODUCTION

M-H Progress

Machine adaptability persists fast turnover even on short runs.

Doubling the amount of space allocated to production equipment, Minnesota Mining & Manufacturing Co. has begun to operate its new 102,000-sq-ft Special Products division plant in the outskirts of Minneapolis.

New plant, with 600 employees, will manufacture electronic subassemblies and associated equipment, turboprop engine regulators, automatic cabin pressure control equipment, magnetic fuel valves, pressure switches and electric fuel flow governors. Honeywell will expect the production of aviation controls to increase by 30 percent during the year.

Production Flexibility—Implementation of the new plant is a "flexible shop," which will utilize skilled workers and highly adaptable precision machinery to quickly switch production on short runs and promptly incorporation of desired changes in design. Honeywell will, which has increased its research budget by 50 percent in recent months, has come up with these system developments:

• Improved method of analyzing and designing aircraft control systems so that early experimental flight testing can be greatly reduced.

• A precision automatic altitude control.

• A punched-card system which automatically provides correct control sequences for air navigation.

NLRB Upholds IAM at Boeing

National Labor Relations Board has overruled protests of Dow Tech's Teamster Union (APLU) on the election at Boeing Airplane Co., in which International Teamsters Union was 31,077 to 41,227. Vote was to determine bargaining agent for 15,800 production and maintenance employees.

In two other elections elections 19 checks and union chose the Seattle Professional Engineers' Association as their representative, while maintenance departmental union (MDU) employed 1,000 employees of the International Brotherhood of Electrical Workers (IBEW) to represent them, instead of the International Brotherhood of Electrical

Workers (APLU). The two IAM groups were then joined by the board.

Tenants' Union's main protest was on the ground that 200 beliefs wrongly identified the IAM as affiliated with AFL instead of being independent. One board member, John M. Houston, dissented from the board decision, and voted to let make the first election and held another.

Lockheed Aircraft Wage Rates Up

Rising the wage rates on 130 job classifications to conform to those of other unions in the area will be implemented April 1, 1969, according to the International Association of Machinists. Increases range from 4.5 to 10 percent. Some 42,000 workers in the plant involved will get wage increases ranging from 3 to 10 cents per hour as a result of a study made by a union-management joint committee.

The job rates lagging behind those in other plants as being major factor in the fact that the overtime load that Lockheed paid premium rates in 1968 job and paid higher than the rest of the aircraft industry in 1967.

The company said the highest rate in the country is paid at the plant in El Segundo, Calif., North American's highest at 29 cents, and Northrop was highest at 45 cents.

Piper Leads in Lightplane Shipments

Reported aircraft totals in 1968 per unit aircraft production by 11 principal manufacturers showed a total of 3,518 planes shipped in the year, the Financial Audit Council of Aircraft Manufacturers Association reported. The total was barely more than a tenth of the plane ship totals by principal categories in the last year, 1966, when 33,224 planes were delivered.

As previously reported [AVIATION WEEK, Jan. 16] Piper Aircraft Corp led the industry in shipments. Piper's total was 1,776 planes, second from a predecessor figure of 1,235. Other major aircraft manufacturers in the year included Cessna, 1,111; Beech, 298; Rockwell, 214; Learjet, 156; Mooney, 79; Bell, 47; Grumman, 46; Research [Europe], 53; TEMCO, 52; Tashkent, 37; Bellanca, 27.

Multi-union Setup Okayed for NEPA

Report of Fairchild Engine & Airplane Corp to combine association of 103 NEPA districts employees to use union, and be represented by National Electrical Workers Board.

Board ruled that there would be no jeopardy of national security resulting if the employees, who are engaged in aircraft research for the Atomic Energy Commission, were represented by several unions other than one.

Instead, NEPA passed the request of craft unions to split the employees into five different groups for bargaining purposes. Separate elections will be held among machinists, electrical workers and breast iron workers, pipefitters, and all other craft and employees involved in the CIO and Congress of Industrial Organizations. Workers in AFL International, the International Federation of Electrical Workers and the International Union of Machine Trades (IUM) had.

In addition, the plant's 47 guards already have a union of their own.

Of the 102 employees involved, the 49 who would be cut off into the four special craft units are highly skilled workers.

Fairchild, with ownership by the CIO chemical union, asked that they be left a single bargaining unit for all 102 employees because:

• The craft units are highly diversified.

• The company said the highest rate in the country is paid at the plant in El Segundo, Calif., North American's highest at 29 cents, and Northrop was highest at 45 cents.

• The bargaining pattern on aircraft is as varied as that of craft firms.

• The multiplicity of unions would be disruptive to national security in the event of nationwide dispute which could not be settled without giving out information about how the different craftsmen are performing atomic energy research.

NLRB rejected these arguments. The Board pointed out that NEPA has consented to the combination and that the process could not be circumvented, nor would it be permitted, to go out and re-elect the union chosen by NEPC to conduct national security.

British Air Exports Increase One-Third

British exports of airplanes and equipment in 1968 increased one-third over the two preceding years. According to the Society of British Aircraft Manufacturers, Elst showed that November's \$4.6 million boosted the year's total to \$17.5 million. That left a gap of only \$4.6 million to complete the year's target of \$22.4 million.

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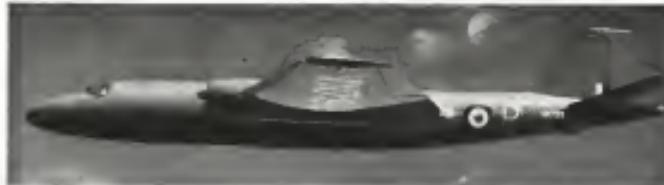
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AERONAUTICAL ENGINEERING



Design Analysis

Canberra: First British-Built Jet Bomber

Small size and short range of plane, while having little utility by U. S. standards, fit England's basic needs.

By Robert McLaren

The English Electric Co.'s Canberra jet bomber is uniquely British in that it has been built consistently in the United States. This is difficult to assess the plane on the basis of its technical standards. To the British it is an "ugly" aircraft and one quite probably selected to the produce needs of the Royal Air Force.

By U. S. standards, however, it is neither "ugly nor fast," as it is slightly too large for a fighter, slightly too small for even a "light" bomber.

It is this anomaly of class first led the Canberra to be called as "six a fighter," because it is smaller than a typical light bomber, and as "advanced medium bomber" because it is larger than a typical U. S. fighter. For six years Britain's discussion of the plane has proved tantalizing to American audiences.

► **General Components.**—The world's first jet bomber was the Douglas XB-45, which first flew in 1942. In 1946, English AFB (Marshall, Calif.) it is early design that the Canberra resembles most closely in size, weight and performance, although differing widely in appearance.

A speed rating of 400-500 mph has always been adequate for British purposes as the need of the plane is for

conventional operation, and the development of the British interceptors, with its emphasis of one hour, was based on war-time technology.

The XB-45 was a development of the Douglas XB-42 (later XB-47) attack plane. By 1948 tactical standards, an explore the size and weight of the XB-45 and the Canberra was classified as an attack or light bombardment type, but by modern U. S. tactical standards such a plane is too small for a light bomber.

In the lighter class, the Canberra must easily approximate the Curtis XP-87 Blackhawk and the Northrop F-89A Scorpion two-man all-weather fighters.

Evaluating that the Canberra size and weight more logically fall into this class comes from the report that English Electric is preparing an all-weather fighter version of the plane to be produced concurrently with the bomber version. Assessment of its characteristics would indicate that as an all-weather fighter the Canberra is a logical and rapid development of the basic design.

► **Specifications.**—Control—Evolution of the Canberra as a bomber is a manifestation of the peculiar British tactical problem. The British Air Ministry has never been concerned seriously with the problem of range in the preparation of specifications for tactical aircraft, because of the proximity of British bases to possible continental targets.

A speed rating of 400-500 mph has always been adequate for British purposes as the need of the plane is for conventional operation, and the development of the British interceptors, with its emphasis of one hour, was based on war-time technology.

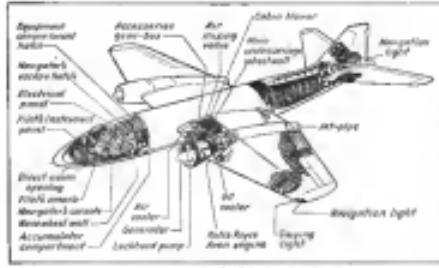
► **Low Aspect Ratio.**—The Canberra is an unique attempt to steal the best advantages of light wing loading and low aspect ratio without suffering the adverse consequences of both. The well-known advantages of light wing loading in reducing tailift can and increasing rate-of-climb and ceiling are considerable against high speed, which is necessarily linked with high wing

Canberra Basic Data

General	
Span	84 ft.
Length	57 ft. 6 in.
Height	15 ft. 7 in.
Track	15 ft. 7 in.
Wing	
Area, gross	560 sq. ft.
Aspect ratio	4.3
Stall speed, closed	15 ft.
Thickness chord ratio	
12% at root to 9% at tip	
Dihedral	2 deg. starboard, 4 deg. starboard
Incidence	1 deg.
Stabilizer	
Span	37 ft. 45 in.
Starboard and elevator area, gross	71.2 sq. ft.
Incidence	
Dihedral	10 deg. starboard, 10 deg. port
Incidence	+3 deg. nose-up, maximum +4 deg. 52 min., minimum -3 deg. 32 min.

English Electric designers, who have done an excellent job.

► **Low Aspect Ratio.**—The Canberra is an unique attempt to steal the best advantages of light wing loading and low aspect ratio without suffering the adverse consequences of both. The well-known advantages of light wing loading in reducing tailift can and increasing rate-of-climb and ceiling are considerable against high speed, which is necessarily linked with high wing



Cutaway showing details of Concorde's landing gear.

headings. Hence, the choice had to be made between these two extremes.

Prior to the Concorde, the choice was a straight compromise between high speed at one end of the scale and the other parameters at the other end of the scale. The English Electric design team, however, adopted a low aspect ratio and a comparatively new conclusion to the consequences.

Use of a low aspect ratio has attained a new importance in the design of aircraft capable of speeds at which compressibility effects become substantial. The reduced speed provided by a low aspect ratio also permits drag reduction in the low drag range of the wing.

► **Design Philosophy**—Against these performance advantages of low aspect ratio must be weighed an adverse effect on range. While the use of the lower wing loading reduces the optimum aspect ratio, it also reduces range. However, this reduction does not bring the optimum down anywhere near the value of 4.3 used on the Concorde.

Therefore, the problem lay in balancing the reduction in drag due to compressibility against the increased induced drag in both affect the range of the aircraft.

English Electric designers probably believed that the low-wing loading would permit the use of comparatively low lift coefficient at the cruising conditions, which would, in turn, minimize the induced drag in both affect the range of the aircraft.

It is apparent that selection of the Concorde wing planform involved the performance of many studies of wing airfoils and plots of wing loading and aspect ratio against performance. How well they have succeeded in obtaining the optimum conclusion of these two parameters can be determined only upon analysis of the per-

formance figures for the airplane. Several other factors served to weight the selection towards the low wing loading end of the scale and away from the high speed end.

One of the basic requirements of the design was a very high operating altitude at which good fuel economy would be required. It is reported that 50,000 ft is the required ceiling of the airplane and this can be obtained only with a very low wing loading. Maneuverability at high altitude can also only be obtained with very low wing loading.

The whole secret of the Concorde's performance lies in the two Rolls-Royce Avon turbines. These small, light engines apparently develop 7,500 lb static thrust, easily the largest of any jet aircraft engine in the world.

With this limited power available in very low-wing aircraft, much of the fine points of aerodynamic compromise given by the board and the designer is fixed from the majority of his performance design problems.

With a power loading certainly no greater than this, the Concorde designers were able to obtain transonic performance from this airplane—even had they ignored, virtually, consideration of aspect ratio and wing loading.

There is little question that the Concorde can reach 50,000 ft, since at that altitude it has roughly 1,700 lb of thrust left and its drag is often to only about 45 percent of its total takeoff, gaining compressibility effects.

In low-wing loading and short takeoff mode, maneuverability at that extreme altitude and at these altitudes that consider it ideally suited to all-weather fighter duties.

► **Powerplant**—**Messuring**—English Electric engineers followed the now familiar British propensity for wing ring leading edge-thrust traction to permit easier mounting directly through the wing spar. This structural configuration is indulged in, probably, on

airframe figures for the airplane.

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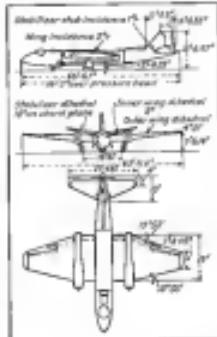
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There is little question that the Concorde can reach 50,000 ft, since at that altitude it has roughly 1,700 lb of thrust left and its drag is often to only about 45 percent of its total takeoff, gaining compressibility effects.

In low-wing loading and short takeoff mode, maneuverability at that extreme altitude and at these altitudes that consider it ideally suited to all-weather fighter duties.

► **Powerplant**—**Messuring**—English Electric engineers followed the now familiar British propensity for wing ring leading edge-thrust traction to permit easier mounting directly through the wing spar. This structural configuration is indulged in, probably, on



Three-view aspects of Concorde

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the assumption that the enclosing metal portion is one of minimum drag.

Research in this country has indicated that this is not necessarily true and some studies, measured in the free position below the wing, and properly fitted, exhibit drag no greater than the wing position.

The Camberra designers minimized the structural cost of this noseplane by locating the engine wholly forward of the wing spar, thereby making necessary only a trapeze mount.

► **Flat Fairings**—Single-spar layout is used in the Camberra outer wing panels and engine and flap are carried by light struts. It seems apparent that these outer panels were not fair for fuel storage, and integral tanks could have been used with no structural penalty, although consisting of welding, filing, venting, gaging, etc., would have been added.

Fuel is stored entirely within the deck above the bomb bay, and it is reported that even if this space is not entirely filled, is that technical curiosity is unusual concerning that apparent lack of fuel storage in the Camberra.

It is reasonable to assume that the consumption of the Avon is approximately proportional to the power and, therefore, greater than most other turboprop engines. It follows that the fuel storage location of the Camberra should have been determined by its designer. Apparently, this was not so, leaving a large question mark as to the fuel tank storage of the aircraft.

► **Stringer Attachment**—One of the inexplicable structural techniques used in the Camberra is the method of attaching ribs and stringers to the wing.

A threaded anchor-clut is nested into the rib and turned at right angles to the plane of the rib. A screw is then inserted into the eye and through the struts. Each rib is fastened to the aircraft sheet fastening material and has fixed points on the surface.

In U.S. aircraft, however, the purpose of that arrangement is not too clear. It is obviously expensive, time taking and messy of the "hand-made" type of aircraft construction. In purpose, then, west is in structural efficiency, but it is doubtful that such an attachment can seriously roll the skin and coat, in cost, maintenance or structural integrity.

► **Deck Layout**—Despite the claimed capacity of 10,000 lb. of bombs, the arrangement of the flight deck would seem to raise some questions regarding boarding procedures.

The pilot is located in the normal

position, but the only other crew member, a navigator, is situated behind him. There is no evidence of a bombardier location in the forward portion of the craft. Also all of the plastic nose is used by the pilot's instrument panel, making it impossible for the second crew member to have an alternate station in the nose as a bombardier.

While bombing by radio is the accepted method in strategic and heavy bombers, apparently it would not be intended for a machine of the short range of the Camberra.

As an all-weather fighter, however, the navigation arrangement is excellent, with the necessary component pieces enough for the required display scopes. While it seems that another feature necessary for a warplane, there is no extra storage under the pilot's floor for two 20-mm cannon and for reliable combat rockets in the center wing panel.

► **Cow Boom**—A truly unique development in the Camberra is the use of an auxiliary gear box for torque drives, a system long advocated in this country but not yet used in practice. Each Avon engine has a single power takeoff which is rotated inboard to an auxiliary gear box mounted in the wing leading edge.

Starboard box drives a generator, hydraulic pump and a compressor. Port box drives a generator, hydraulic pump and a radio compass.

It means odd that with two large air compressors available in the two turboprop engines that are world-wide made of separate blowers for cabin air conditioning.

► **Stabilators**, Flaps—The Camberra variable-incidence stabilizer is as distinct contrast to U.S. practice in that the rear spar is oriented with the front spar positioned. U.S. jet aircraft provide the incidence angle to provide the incidence change. Both the Camberra and U.S. high-speed aircraft use incidence angles for the purpose.

An unusual feature of the Camberra is an auxiliary wheel. When U.S. designers utilize plastic skin, they will not advocate auxiliary nosewheel. Camberra designers went one step further and built the entire fin out of wood.

It will be of interest to see how this structure holds up under service, both as to atmospheric erosion and as to electrical transients.

► **RAF Order**—Two Camberras are now flying and English Electric is in production on an order for 12 service test aircraft for the Royal Air Force. Reports indicate that the RAF, as well as the Dominions, have had production plans for the type in the near future.

It would appear, in general that the English Electric Camberra is an effi-

cient airplane with unusually high performance, a high element of cohesion has and unusually smooth handling characteristics. If its excellent high altitude characteristics and is highly maneuverable at all speeds and altitudes.

However, on the basis of this

analysis, the aircraft would appear best exploited as a high altitude, short-range, all-weather fighter. In this configuration its maximum speed would fall slightly under that of the best U.S. designs at low and medium altitudes but would be definitely superior above 30,000 ft.

What a Spray Plane Should Have

Low-wing design, with less than 200 hp. and payload of 1250 lb., should replace makeshift agricultural craft.

By A. Howard Blackstock

Development of a suitable agricultural aircraft sprayer has not kept pace with increasing demand for safe and economical spraying. An active pilot and engineer for 15 years, formerly was engaged in planning and operating and one of the few who has survived an aerosol crash which destroyed the plane. He has given advanced flight instruction and participated in flight test, systems tests and design of spraying equipment. Presently, he is interested in earth survey research.

Still later, after World War II, better and less expensive herbicides became available as a result of developed war research. That plus the necessity of producing more and more food for our nation and the rest of the world, further assisted the demand for aerial spraying and seeding.

The additional aircraft needed to take care of this demand were obtained mostly from the stock of surplus propeller-driven planes dumped on the market after the war.

► **Aerosol Flight**—Using these airplanes, the first aerosol of any kind, face, hair, seed, paint, etc., was sprayed in the past few years. In the six year period ending in 1948, 97 planes received field spray and 77 were originally equipped as 127 aerosol. Apparently 10 percent of the 1930s-old agricultural aircraft were destroyed.

Majority of these pilots already or finally retired were highly experienced, having had more than 1000 hr. flying time. This explains, perhaps, why the agricultural pilot has the dubious honor of being considered the insurance company's worst risk in the aviation industry. Why his premium payment is \$7500/lb. insurance is approximately \$100 on each 127 of cured spray.

► **The Needs**—Obviously, something is fundamentally wrong with the planes now being used for agricultural work.

Plane delivered at the Annual Meeting, Society of Automotive Engineers, Detroit, Mich., Dec. 1-12, 1951

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Thus continued use, particularly in the face of a stepped up demand for agricultural and forestry service, will evidently hinder the dismal growth of the industry through perpetuation of high costs for their services and the winter cost cuts to which the planes are exposed.

With the exception of the airplane, however, we have a very limited need to keep aircraft off the ground for such service. Proper materials, dispensing equipment, and know-how are at our disposal, largely because of competitive efforts between various federal agencies and private industries.

Now that we have a knowledge of the serious limitations of present agricultural aircraft, we need the same kind of cooperation to build a new airplane specifically designed for this and economic operation.

► **Craft Limitations**—Present agricultural aircraft have insufficient payload to justify their cost of operation. Most have a type of construction which necessitates high costs for accident repair and for general maintenance.

Many are unarmed, minimally prepared for protection against crop damage.

Their general drug characteristics, according to incomplete experiments, vary greatly in enriched weight and weight of coverage.

Prominently because these aircraft were not designed for the job and, in some cases, have insufficient power, they are not sufficiently maneuverable to operate safely in close quarters and still give side visibility and adequate coverage. Under heavily loaded conditions, they require, for safe operation, long take-off runs, overwhelming long landing runs from airports or other suitable fields.

Most important, they lack a safety provision in the fact that these aircraft provide virtually no designed protection for the pilot when accidents occur. And, arrangement of the cockpit is such that the pilot is extremely vulnerable to serious or fatal injury in survivable crashes.

► **Plans**—Modified—Admittedly, the choice of a specific design without these limitations is not an easy one. In an attempt to partially solve the problem, several high-speed manufacturers have placed crop-spraying aircraft on the market which are, in reality, modified versions of their personal-type planes.

Records indicate, however, that these planes have not been a successful solution.

► **New Design Benefits**—Recent study and investigation confirm the conclusion that an airplane can be designed and built which would be relatively free of the limitations mentioned. At higher initial cost, cost would be offset over a period of time by greater economy.

resultive materials increased by greater engine volume, larger overall size, lighter, lower maintenance and repair costs, and reduced pilot insurance premiums.

In considering the following proposed design, it must be remembered that agricultural flying will always be considered unusual business. In its heavier equipment of flying at extremely low altitudes and close to trees, buildings and electric wire will never permit such work to be classified by insurance companies in the same commercial group as truck drivers, for example.

However, danger of fatal or serious injury can be reduced markedly, with proportionate reduction of insurance costs.

► **Feature Details**—It is proposed that a portable and durable airplane for agricultural use have the following features:

The craft would be a low-wing design, powered with an engine of over 200 hp. It would operate effectively at 60 to 70 mph with a payload of 2150 lb. and would take off in a minimum of 1000 ft., loaded to gross weight.

The low wing is desirable for several reasons:

- It eliminates the chance of unusual or potentially unpredictable pilot errors throughout an arc of 360 deg.
- Pilot safety is improved in severe accidents because of the wing impact absorbing, protective effect provided by proper design.
- It is believed that the low-wing achieves "downwash" effect relative to the working altitude of the airplane, thereby providing better coverage and penetration.
- Construction costs are less and field servicing is more efficient.

► **Ballast Wing Sections**—Wing, fuselage and tail section would be all metal construction. Because of metal availability, to reduce the cost of energy and its corresponding qualities, performance costs would be reduced, pilot safety increased.

A desirable construction feature would be to have the wing composed of a number of hinged sections. Tip sections could be attached so that impact with a telephone pole, for example, would shear off the section instead of dragging the airplane into the ground. In case of damage further aftward, the hinged sections would prevent quick and inexpensive replacement.

Use of a high lift device is dictated by the requirement of good maneuvering characteristics under maximum load conditions and relatively slow speeds. Adversely should be designed to permit a high rate of roll with low applied forces.

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GILFILLAN'S GCA CONSOLE in the L.A. control tower contains a curved lens scope (right), and two position scopes for blind landing. On the left is the three-mile final approach scope, so the entire 10 mile scope for craft's position on final approach is shown in these dimensions: distance to \approx 13 feet.

DEDICATION of GCA at Los Angeles International Airport marks a great day for Gilfillan. It signals a long step forward in air navigation and safety. It is the realization of years of GCA research and development at Gilfillan.

Today, folks who fly the airlines to or from L.A. Airport can relax in a new assurance of safety... secure in the knowledge that the finest in air navigation equipment protects them.

A new surge of confidence in air travel will result. For with Gilfillan GCA, airline schedules will be regular and on time, delays and cancellations rare. Airline operating costs will go down, air safety up.

82 similar GCA installations will be made at key CAA airports by 1952. Gilfillan, in cooperation with the USAF, the USN, and the CAA, is proud to have pioneered and developed the GCA of 1950.



Gilfillan's radar surveillance antenna (right), reaching through 160° , scans a radius 30 miles out and 10,000 feet up. Position of every aircraft on a 2,000 sq. mi. area is picked up and shown on the surveillance scope.



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IAS Papers

This is the third and last installment of digests of papers given at the 18th Annual Meeting of the Institute of the Astronautical Sciences in New York City, Jan. 23-26. [See AVIATION WEEK, Jan. 10 and Feb. 6, for other installments.]

Aldis pilot Overpressure Study on Cockpit Ventilation Problems. T. M. Edwards, Civil Aerospace Administration.

A detailed technical overpressure was formulated through study of Air Force and Navy physiological relating to problems of vision from cockpit. Six thousand open questions were distributed to all aircrew pilots and approximately 2500 were sent back.

The questionnaire covers detailed analysis by the pilot of the adequacy of vision as specific detection and as specific mission vision for the airplane they were flying. Data from 1000 questionnaires were received from DA-1, DA-4, DCA, Cessna, Cessna 180, and Martin 202 aircraft to provide information evaluation and comparison. These data are correlated with results obtained from self-ratings, eye dimensions, and other vision characteristics of flight.

Surveillance Testing of Prototype Air Transport. W. F. Gandy, Civil Aerospace Research Division, Civil Aerospace Board.

History shows that past and present methods for determining the mechanical reliability of aircraft components and structures are not entirely satisfactory. Today's technology makes it possible to prove some new criteria. Reliability can probably never exactly predict the appearance of so-called "worst" lot ascendents to improve upon the test standards as a result of a study carried out by the CAR.

The past and costs of accelerated testing, design, and reporting are being investigated in the hope that a more reliable state of operational experts may be derived. First, DA-38 Design-H 2, Housers, Power Plant Development Section, Civil Aerospace Administration.

The first two phases of the study will be:

"To determine what can be taken in terms of new methods to reduce flight test hours and to reduce cost, and flight hazards."

Tested safety that will be gained through the development of lessammable fuels for aircraft is recognized. But the potentialities of aircraft powerplants to improve combat effectiveness from greater range, extending the use of high-mission materials and equipment, improving fire detection and fire detecting systems and making use of the best insulating agents available at the least cost are not explored.

Propulsion, bearing components and fuel tanks are the primary subjects of the discussion.

Program for Fire Prevention. L. Radcliffe, Chief of Flight Branch, Lewis Flight Propulsion Bureau, NACA.

This is a review of existing fire problems with suggestions for placement of research emphasis.

A Note on Combustion. William J. Shultz, Republic Aviation Corp.

While the present effort toward improv-

ing the safety record in aviation has been directed toward accident prevention, it must be recognized that more accidents will occur. Therefore, it is essential that progress be given the maximum attention despite the grave nature of the problem.

CAR studies on field survival procedures and their effect on aircraft survivability, and the effect on the safety record of greater passenger protection in these accidents is indicated.

Emerging crash load requirements are presented. It is shown that many of these requirements are inadequate, in terms of the actual experience represented in unavoidable accidents.

It is recommended that seat and belt strength of at least 20g be provided in all types of aircraft, and 40g where feasible, and it is shown that the human body can tolerate these loads. The weight increase involved is negligible.

Biokinetic Behavior of the Human Body During Crash Deceleration. E. R. Dury, Head of Development Division, Cornell Aeronautical Laboratory.

A series of experimental apparatus consisting of a pilot, full-scale propeller airplane cockpit, and three crash test dummies was used in a two dummy model cockpit configuration by shock tests to simulate crash conditions. Computer analyses of the major inputs of the body and head were made on paper, and solutions were made to determine the optimum load limit for a specific deceleration.

Excessive or constant pressure in engine cooling leads to the conclusion that large quantities of heat influence are badly needed.

Use of aircraft turbines as an engine power source for aircraft also presents both aircraft performance and aircraft fuel system problems in addition to pumping equipment and sealing arrangements are summarized.

Robert Merton, Chief Development Engineer, Germanos Aircraft Engineering Corp.

This paper is restricted to the discussion of ramjet installations. It is pointed out that many installation difficulties can be avoided or lessened by proper consideration of the ramjet installation stage. Problems are divided into three parts: inlet and exhaust sections, engine accessibility and removal, and fuel delivery.

Various types of ram intakes are discussed, as well as the importance of a good inlet system. It is shown that difficulties associated with the inlet pipe and nozzle can be avoided by using a ram intake, as discussed.

Problems of providing adequate accessibility and quick and easy engine removal are mentioned. The need for a simple, reliable engine fuel system is indicated by the poor performance of present day ramjets.

Propulsion and Acceleration. P. McCarthy, Principal Engineer, McDonnell Aircraft Corp.

Although flat plates are a dimension of an aircraft and auxiliary systems like ramjet engines, main power plants also are applicable to supersonic flight. Current knowledge and trends in aircraft design of these auxiliary power and fuel systems are detailed.

Excessive or constant pressure in engine cooling leads to the conclusion that large quantities of heat influence are badly needed.

Use of aircraft turbines as an engine power source for aircraft also presents both aircraft performance and aircraft fuel system problems in addition to pumping equipment and sealing arrangements are summarized.

New Ground Heater For Arctic Operations.

A new type of ground heater, which employs a lightweight gas turbine and a capable of producing 1,000,000 lbs. heating capacity to heat a 500-cubic foot shelter when it is -65° F outside—so-far it has been ordered in quantity by the Air Force from Allis-Chalmers Mfg. Co., Los Angeles.

Designed for use in the Arctic, the new heater put out 10 times more heat than those currently used by the AF. They will be used mainly for protecting aircraft cabins, equipment, ground equipment and living quarters. The AF is paying \$13,000,000 for the units.

Added to the advantage of its high heat-producing ability and the fact that it has no self-contained power source, the new ground heater is small and can be transported quickly by air in a compact form. When outside temperature is as low as -65° F., it is capable of heating out air heated to 150-180° F. from its discharge outlets, permitting as many different heating operations at the same time.

The unit has other important uses by blending compressed air off the turbine, it can be used as a possible source of power for engine starting, lighting, refrigeration, and other applications.

Closeups of British Propulsion Units . . .



Bristol Hercules piston-powered aircraft engine fitted in Vickers-Armstrong Viscount, advanced military transport. Open cooling gives easy access.



Bristol Thrush turbocharged turboprop engine fitted in Handley Page Herald V mid-transport. Note mounting and access provisions.



Armstrong Siddeley Mars radial aircraft engine installed in Hawker-Mitsubishi Hart fighter. This shot illustrates overwing exhaust ducting.



Rolls-Royce Dart turboprop for Vickers Armstrong Viscount twin-turboprop. Closeup shows two-stage centrifugal compressor, two-stage turbine



Daimler-Benz (MB) 302 diesel aircraft powerplant. Right: Overall mounting of modern multi-shaft units on Farley Fody.

Air Shares Help Trust Valuation

But National Aviation Corp., with exclusive industry holdings, has been making periodic shifts of interest.

Airline shares have reflected at most modest growth from valuations when held in portfolios during 1949. This is evident by an examination of the annual reports recently released.

For the most part, general investment type trusts have refrained from increasing their commitments in aviation securities. Whatever limited shifts have been made, together with existing holdings, demonstrate a conservative concept of the future trend of the investment future. The last annual report of these general investment trusts has shown very minimal upturns in making timely adjustments in their aviation holdings to participate in significant price appreciation moves that have occurred in this group.

It is probable that the many uncertainties pervading in the aviation industry, as compared with other industrial groups, have served to act as a deterrent to re-investments among these general trusts. By the same token, the greater the saturation the lower market value the opportunities for profit.

► Aviation. This group of trusts have specialized in aviation investments, particularly in aircraft manufacturing. The largest in the field, and one which possesses a consistent sense of direction, is the National Aviation Corp., making its periodic shifts of particular interest.

As of Dec. 31, 1949, National Aviation's net assets were valued at \$7,939,545 or \$16.65 per share. This represents a marked improvement over the \$14,766 per share valuation as of Dec. 31, 1948, and as from the \$15,441 shown as of Dec. 31, 1947. The year-end book value was attained at Dec. 31, 1947, when net assets aggregated \$28,621 per share.

Because productive qualities of aviation shares are reflected by the \$611,397 received by National Aviation in the form of dividends and interest during 1949, as compared with \$561,523 for 1948. Losses from the sale of securities during last year amounted to \$55,616 in contrast \$307,234 the previous year. This resulted in a net profit of \$216,780 for 1949 as compared to a net loss of \$23,556 for 1948.

As of the 1949 year end, 47.2 percent of total investments were concentrated to

\$4,000 Delta, 40,000 Eastern, 10,000 Helicopter Air Service, "A," 22,000 Pan American Airways, 3000 Pan Am, 5000 TWA and 9310 United Air Lines per share.

► For the first time since 1945, the 1949 year end market valuations of the portfolio held by National Aviation exceeded its cost. As of Dec. 31, 1949, the total market value of its aviation holdings were \$6,165,112.38 as against a total cost of \$5,928,661.27. The largest single aircraft investment was represented by 25,000 shares of Lockheed with a market valuation of \$121,000 followed by \$55,250 in Douglas. Both of these investments show a material book profit over cost.

Among the airlines, the American Airlines preferred, with a market valuation of \$798,000, ranked first but was below the cost of \$829,917.69. The Eastern Air Lines common also showed a market valuation of \$980,000, ranking second, but reflecting a "paper" profit to the investment trust over the cost of \$449,303.09.

National Aviation's suspect for relatively new successful ventures, such as Air Express International Agency, Glaser Hydroplane, Helicarrier Air Service and Resort Airlines, is particularly noteworthy. Of this group, Air Express International Agency is the only one showing a severe deficit, having a market valuation of only \$5000 as against a cost of \$65,600.

Nevertheless, by examining their new security ventures at the time of purchase, the trust has made a solid contribution to the best traditions of private enterprise.

► Disinvestment.—While in terms of the individual investment in each of these four startups National Aviation's commitment is a very small one, its support represented tremendous encouragement to these companies when they would, with help. A very small percentage (less than 3 percent) of the trust's assets are exposed to these new ventures, thus leaving any widespread loss as a remote possibility. In addition, the constraints can make possible continued advances in various phases of the aeronautical field which otherwise would have remained dormant without such help.

With all new projects, there is no assurance of a guaranteed return, in fact considerable risk is present. This is offset by the potentialities of better than average profits if these enterprises fulfill their original promise. This has been the traditional role of venture capital under free enterprise. Great strides in many industrial developments, originating from technological know-how, have often resulted from such pioneering efforts.

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by EUGENE E. WILSON

Formerly President of United Aircraft and Chairman of the Board of Governors of the Aerospace Chamber of Commerce

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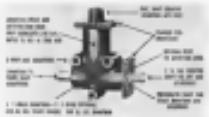


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Right Angle Drive

Improved "ANGLeer," right angle drive offered by Allis-Chalmers Associates Corp., 25 Montgomery St., Hillside, N. J., has been designed for several mounting and uses includes rectangular, shock mounting flange with external pilot or both ends of the housing. This arrangement is in addition to fixed pilot mounting which also allows for two pilot holes. The drive can be machined to permit 2.1 gear reduction as optional feature in addition to standard 1.1.

Stated to be adaptable for many applications where a compact and durable right angle drive is needed, unit also can be used conveniently for "spot" applications on special tooling and similar jobs. Standard device is rated at 250 lb in static torque capacity up to transmission speed of 1000 rpm continuous duty. Units can be furnished with 500 lb in static torque rating.



Machine Timer

For automatic sequencing of production operations, sequential rate, and other jobs where automatic control is required, Industrial Timer Corp., Newark, N. J., offers "Timend" Timer incorporating two individual timing units in single housing.

When timer units do not fit into respective time intervals required, each cycle of operation will follow the other continuously in regular sequence. For example, if two separate production operations require 4 and 2 sec., respectively for their completion, the two full cycles of silent sequencing will automatically start again whenever mechanism is necessary to bring its operation to an end, but immediately re-start second timing element to start 2 sec. again. On completion of 2 sec. period, second element automatically "back back" control to the first.

Timers are contained in portable case not exceeding 11 x 9 x 7 in. Provided are two external sockets into which the timing elements are plugged so that they control single pole, double throw relay contacts. The contact circuit of relay may be connected in series with any number of parallel voltage and current sources. The total rate of operation (load relay contacts) is rated at 250 rpm at 115V a.c. accommodated.

One switch, single pole, three position switch and pilot lamp are integrated with other components to give compact, portable assembly possessing easy operation. Constructed with specially built timers, cast of the standard equipment is very small, according to maker.



Rugged Couplings

For use in mining jet engine duct joints, piping hot air exhaust and similar applications, line of V-band, quick-disconnect couplings developed by Marmon Products Co., Inc., Ingleside, Calif., are designed to provide effective and reliable right-angle interface connections.

Available in three different designs—continuous, segmented, and ventilated (blown)—band-type couplings are engineered to feature light weight with great strength, and extensive dependability over wide temperature and pressure ranges. Suitable ratings to accommodate couplings can be integral with or added to tubing or ducts to be joined. Rolled sheet metal or machined flanges are said to be equally adaptable.



Speed Clips

Test clips, designed to permit rapid lead-up of electrical leads used in testing assembly line products and for connecting experimental apparatus in laboratories, are offered by Gophill, 4524 W. Madison St., Chicago, Ill. Clips can be mounted permanently on panel or, for certain applications, can be easily disengaged.

Time wasted in setting up equipment and plugging wires is kept to minimum since no soldering is required. Electrical leads simply are slipped on or out of spring clamps. Tension is adjusted by tightening hex and flat serrated nuts to panel. Two hex nuts are included with each clip for mounting purposes and wire attachment.



Better Fire Detection

Rugged thermistor, Model 108-1B, for Edison aircraft fire detection systems, is especially designed for Zone 1 applications in the high temperature environment of liquid oxygen storage tanks. Developed by Thomas A. Edison, Inc., West Georgia, N. J., and is claimed to withstand vibration exceptionally well and to give satisfactory operation in temperatures ambient temperatures up to 700°F. This compares to test model thermocouple which is suitable for operation

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THE 1950 SITUATION

All Washington developments point to a natural determination to maintain the superiority of the U. S. Air Force throughout 1950. Manufacturers supplying Air Force cultural well not only contribute their part toward to national security, but can expect other tangible rewards in the form of advantages themselves. This applies to manufacturers of products of all descriptions, for, from pumps to propellers, from aircraft to radar, firms can help to insure the purchase, every single item of Air Force material is controlled by the Air Materiel Command, Wright Field, Dayton.

So, business will be good for subcontractors. You may expect, in 1950, however, greater differentiation to enhance efficiency of methods of supply, closer scrutiny of methods, a determination to secure the greatest contribution to the military effort, an improvement for a tightened financial budget. In the past, companies relying on ordinary sales methods to insure Wright Field business have fallen short because of the greater size of the operation, the widely scattered responsibility of its procedures, and the rapid development of new material requirements. In 1950, you may see that, to assure your full potential of Wright Field business, a formal plan of cooperation is needed. Interim or permanent liaison calls, or even the services of a nearby district office, fail as a specialized field where knowledge based on everyday contact is required.

WHAT TO DO ABOUT IT. Many short compasses, having recognized this situation, ensure present Dayton offices staffed with technical men through which they assist and service Wright Field business. In this way they maintain close liaison with the Wright Field management. The fact that a company Dayton office does receive a valuable service by having Wright Field personnel in touch with industry's activities, by allowing expedition liaison service, and by being available

at all times to discuss problems bearing on Air Force requirements, is recognized by the Air Materiel Command. If that is your plan, we can only applaud your intention, for only through constant, experienced field contact can your goal be achieved. But, if you wish to develop Wright Field business—and of the establishment of a Dayton office and all that this entails appears most attractive—then propose a personal visit. We are alternate means at securing identical options results.

NBS—"Your Dayton Office?" No need. Requirements Service now serves as the "Dayton Office" of a number of highly regarded firms doing business with the Air Materiel Command. By this, we mean that we'll naturally function as departments of each private company, giving counsel and supplementing their regular engineering and sales departments with our specialized Wright Field knowledge.

NBS is an organization of former Wright Field engineers, which, appreciating the interdependence of the nation's industrial and military system, offers a liaison agency to allied industry the advantages of continuous personal representation at the "Procurer's Center" of the United States Air Force. All field representatives employed by NBS are graduate engineers carefully chosen from their fields by virtue of their background, knowledge of the Air Materiel Command, and personal characteristics.

These existing organizations are accounted for our conception of the NBS function. For firms acting in the limited capacity of the usual manufacturer's agent, our field representatives can analyze a client's facilities, policies, and potential business opportunities. Equipped with this knowledge, our representatives plan and assume a definite program of only contacts for each client designed to make known to him where his business opportunities lie, what his customer's exact requirements are, how he may take action to insure maximum performance of all contracts obtained. The value of our specialized personnel is fully evident with the many sources of liaison at Wright Field can hardly be duplicated in any other way.

Obviously such a relationship as we offer can best be realized upon earliest and extensive discussions. These would, of course, establish war bonds files, and their progress to an analysis of your products, potentialities, and production methods. Another analysis of your sales problem, as related to the Air Materiel Command, would result in a plan aimed at field representation at Wright Field as a special department of your company, on a basis of communication to be agreed upon communication with the client involved. We would be very happy to initiate a preliminary discussion at your convenience. Write or phone, and a representative will get in immediate touch with you.

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AIR TRANSPORT

New Subsidy-Separation Proposal

Officials interpret new study made by Ernst & Ernst to favor cutting mail rates to passenger rate level.

A new subsidy-separation proposal which might mean the shifting down of air mail and return-to-passenger levels was submitted to the Senate Commerce Committee last week and promptly ran afoul of sharp industry criticism.

The proposal, described as a "pilot study," was put out by the nation's largest air mail carrier, Air Mail by Ernst & Ernst, New York accounting firm. It recommends that airway pay no rates as set by the Post Office Department should consist of:

- A fixed amount to cover handling and terminal costs. This would run near the higher terminal costs of short-haul carriers, compared with long-haul carriers. (Staff of the Senate committee is now making a study to determine terminal costs.)

- As additional variable amount based to the passenger rate structure and designed to compensate carriers for the "loss base." Writing at the study was that the "loss base" will be based upon a fixed relationship to the passenger rate. Implementation was that the mail rate should be less than the passenger rate. It suggested that "excess items" (presumably return airmail, first class, etc.) in passenger service should be considered in gauging the mail rate in it.

Airlines carriers looked hard for a silver lining. They "hoped the Ernst & Ernst report didn't mean what it sounded through in name." Its basic heading left the way open for almost any meaning. Mail rates could be double or triple passenger rates and still be "within limits."

But industry officials generally deplored the lack of black-and-white in the report proposed to dash back and forth to the few passenger rates.

► **Rate Comparison**—Passenger rates are now approximately equal to 60 cents a one-way, regular, and 40 cents a round-trip, coach. Mail rates now average 60 cents a ton-mile, considerably above the Big Four (American, United, TWA and Eastern), 30 a ton-mile for all classes, inc. trans. taxes, and substantially higher for trans. fees.

The report said that either regular or mail passenger rates could be used as the standard for determining mail rates. If the mail rate was used, it suggested that "loss base" passenger rates should be less than the passenger rate. It suggested that "excess items" (presumably return airmail, first class, etc.) in passenger service should be considered in gauging the mail rate in it.

► **Higher Fare Trend**—There was specu-

lation that the report's formula, if adopted, might touch off a move for airline passenger fare increases. An Transport部's counsel, Stuart Toplin, discounted that "It might mean too big a reduction in revenue through volume losses." But, he conceded, the Ernst & Ernst recommendations "are doubtless well out the present level of the industry toward lowering passenger fares, while the threat of being pushed and pulled around may hang over them."

Chicago & Southern Air Lines Board chairman, Carlotta Parsons, was the first among leaders to attack the report.

"It basically abandons us to difficult any idea of determining the actual cost of carrying the mail and suggests, instead, for convenience's sake, that mail can be related to passenger fares," Parsons commented. "The proposal overlooks the fact that passenger fares have no relation to mail costs, (but) we are kept down to levels the public will pay—and are duly charged to obtain the maximum possible revenue. The suggestion now makes rates for the mail comparable to related to passenger fares the upper three tiers of fares and leaves the rest and supporting the foundation."

Other developments:

- TAN Airlines engaged the Washington law firm of Soltens, Berndt, & Shea on a non-exclusive retainer of \$50,000 to represent that company in the subsidy-inquiry investigation zone. The lines are: Brazil, Capital, Chicago & Southern, Colorado, Delta, Mid-Continent, Northeast, Northwest, Piedmont and South Central.

The law firm declined to comment on a report that after other studies but two—American and Eastern—have given up.

- Stockholders have developed among ATA members to push for a separation plan, similar to that one applied to railroads and steamship lines, as a countermove to the Ernst & Ernst proposal. Under this plan, CAB would act as "hub" and compensation and additionally slot sheet subsidy payments at its hub, in the interest of reduced delays in connection. The lines signed up with Soltens, Berndt, & Shea, says spokesman, their first inclination to oppose all subsidy separation plans and push in that move.

- Aon of American Railroads and railroads have agreed to set up three separate holding companies to handle the railroads' freight business. The Ernst & Ernst plan, which fractions have long argued that air mail rates should be equal to or less than air passenger rates.

- **Erwin Johnson** (D., Colo.), chairman of the Senate's Interstate and Foreign Commerce Committee, defended the mounting impatience in Congress to relate government support to airlines when he submitted the Ernst & Ernst report for review to other committee members. "All of us," he said,

"want to be helpful and constructive, but, at the same time, frugal in the expenditure of federal funds." Meantime the House Interstate and Foreign Commerce Committee also is reviewing the report.

The Ernst & Ernst report is substantially less in its proposal for "subsidiary" (industry) payments to carriers: cost and share the service payments but its recommendations would slash basic subsidies and impose demands on air lines for their subsidies.

► **School Aircraft**—It proposed that airlines be given subsidy allowances, not only for non-poolable routes operated in the national commerce or defense interests, but also for noncommercial operations forced by weather, the grounding of equipment, mandatory equipment modifications, training, preparing new aircraft, and new route development.

A "standard cost of operations" would be established for each carrier, giving consideration to its particular circumstances. The industry would be the ultimate between revenue and "standard cost of operations." Lines which failed to measure up to the standard would suffer. West & Rose said, and that would be an incentive for economy. (See sidebar, "Proposed" suggests that lines might, instead, be encouraged from generating non-mail revenue because it might receive less subsidy payment.)

A large portion of subsidy requirements would arise from "extinction," Ernst & Ernst suggested. It proposed additional quantity rebates, improving paper-mail-on-carrier, to avoid so-called shielding misuse, un-subsidized west coast, modification of existing performance standards, reclassification with respect to route distance, direct labor performance valuation, related indirect valuation, and other performance variances.

Colonial Abandons Court Fight

Colonial Airlines has abandoned its court fight against Air Mail by Canada, an independent airline which opened the way for creating Trans-Canada Air Lines a competitive route between Montreal and New York.

The case, which was to be argued before the Supreme Court this week, placed an injunction on TCA more than 45 bilateral air transport parts negotiated in executive agreements.

► **Stock New Routes**—Colonial still maintains that it has been injured greatly as a result of the proposed Montreal-New York grant to TCA. But, in dropping the suit, President Sigurdur Jossen said pointedly that ample power exists in CAB and in the White House

to alleviate the rigidity to Colonial.

"With the increasing gravity of the international position, we have concluded that it would not be right, in the public interest, to challenge the executive power of the government to make executive agreements with foreign powers," Jossen continued. "It is hoped, however, that additional air routes to and from Canada are already secured . . .

► **Shaw Cross**—Gordon-Caledon's court fight on the agreement brought together again last December when the Canadian Air Transport Board ordered the carrier to show cause why its New York-Montreal license shouldn't be revoked. Last month, the CATB agreed to withdraw action as to those causes under pending the Supreme Court's decision.

The U.S. in turn, divided not to go far in direct New York/Toronto or Canada/Montreal routes. The CATB's license fee is estimated at 35 cents a gallon, compared with 55 cents for gasoline and 15 cents engine. Purchase price of the Conest is placed at \$1,350,000.

► **Holding Allowance**—Duane made it clear the allowances for holding, approach, etc., on a comparable time basis with those for prop-engine transports. Allowance for diversion to alternate fields is on a distance basis for both types.

The British transportation spokesman said his figures are based on the Conest's present performance. It predicts even more favorable figures later as it shows increased thrust from the Ghost engine for takeoff and emergency climb, decreased specific fuel consumption for cruising, increased gross weight and increased internal fuel capacity.

The 119-ft-long building will comprise plane passengers and airport visitors. Visitors can enter via the third floor observation deck directly from outside, while passengers arrive at a 40-ft-long loading dock on the ground floor. The entrance hall to the second-floor passenger level by stairs or on escalators. From there they proceed to diagonal ramps to board the planes. The two ramps on the first stage of construction will be able to accommodate a total of 47 planes.

Airways Engineering Corp., Washington, D.C., are responsible on the engineering of the airport, and the building was designed by Philadelphia architect, Carl Glaesel & Vice Associates. The building's exterior has reduced changes made by 16 Boeing pilots who alleged that Bilezik had a past record of accidents and irresponsibility. The robbery and the pilots who made the change in a letter to Eastern Air Lines are in court.

Comet Cost Figures Optimistic

Optimal operating cost figures for the Comet jet transport, based on maximum performance of the prototype, have been issued by de Havilland Aircraft Co. of Canada.

The British manufacturer says results to date have not yet justified much profit per year ago that the Comet's typical would mean that revenue the cost of higher fuel consumption inherent in the jet engine. "Compared with the most modern transports at this stage in service, the Comet may be expected to be about 20 percent cheaper per ton mile of payload and to fly at least half as many as two miles per year," de Havilland stated.

► **Cost Comparison**—The 20 percent figure based on a typical fuel input of 1,900 to 2,000 lb/hour is based on the assumption that the aircraft's maximum fuel load (5,000 lb) is in its trim configuration. The aircraft's maximum fuel load is estimated at 35 cents a gallon, compared with 55 cents for gasoline and 15 cents engine. Purchase price of the Conest is placed at \$1,350,000.

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Put Blame on DC-4

Assuming charges filed by the Civil Aviation Administration (Aviation Week, Jan. 16), Boeing Pilot Kirk Bilezik had claimed formally that he was flying his P-58 in a certain red station master when it crashed into an Eastern Air Lines DC-4 near Washington National Airport late Nov. 1, killing 35 persons.

Bilezik said the accident "resulted solely and exclusively from the negligent operation of the DC-4 with which he collided and/or from carelessness and negligent operation of the Washington National Airport control tower by employees of the Massachusetts Civil Aviation Dept." Meanwhile, the Boeing embankment has reduced changes made by 16 Boeing pilots who alleged that Bilezik had a past record of accidents and irresponsibility. The robbery and the pilots who made the change in a letter to Eastern Air Lines are in court.



EMPLOYEE BENEFITS WEIGHED

Management heads of the airline industry, represented by the Association Conference, E. S. Wilson, manager of United Air Lines' in-service division, O'Farrell Egan, treasurer, Alitalia Transair Corp.; J. L. O'Brien, executive director, Airlines Personnel Association Conference, and Gordon A. O'Reilly, president, Aerostaromic Radio, Inc.; K. F. Kirby, executive secretary, Aerostaromic.

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Bid Turned Down

Nonscheduled aircrew hopes of participating in trans-Alaska Holy Year traffic are fading rapidly as the curtain rises on most CAAI actions.

Civil Aviation Board has rejected an application by Polarized Airlines, Inc., New York, to conduct an emergency flight over the Arctic route between flights during 1978 winter contract with Holy Year Pilgrimage, Inc., a nonprofit organization (Aviation Week, Jan. 30). Applications used by the Board in turning down Polarized's bid were similar to those employed previously in disapproving Pan American Airways' proposed Holy Year flights under contract with Felix Ross (Aviation Week, Jan. 30).

CAB and Federated had not passed that its proposed flights would be limited to Polarized's educational program, which includes flights over the majority of the Board's police statement on trans-Alaska charters issued last December. The Board ruled that the large number of flights for which Polarized sought permission would result in a serious disruption of the unaffected air traffic pattern and would result in substantial diversion from regularly-certified services.

CAA Would Suspend Pilots Who Collided

Civil Aviation Administration wants to suspend the pilot certificates of two captains and two co-pilots whose aircraft impacted each other in midair with two lightplanes during the course of a year.

CAB in CAA's complaints to the Civil Aviation Board were The American Aviator Captain George F. Karch and First Officer Malcolm S. Wade, whose Constitution collided with a Cessna 140 near Post Watchung, N. J., on Jan. 30, 1978, and Capital Airlines Captain Jack N. Bolich and Copilot Leonard F. Davis, whose DC-3 hit a Cessna 180 in the vicinity of Mansfield Field, Mansfield, on Aug. 7.

In the CAB's opinion, CAB claimed that the crew of the Constitution became "disoriented" in the dark, after flying away from the right, ran into the presence of the Civil Av Regulation, CAA and the Constitution, flying at 1800 ft, was continuing the initial climb and should have altered its course.

Causeless Charged—According to CAB, Captain Karch and First Officer Wade failed to mention a proper look out so as to avoid the collision and thus operated their craft "in a reckless

and needless manner so as to endanger the lives and property of others." The agency stated that the two aircraft failed to contact the high degree of skill, care, caution and judgment required of the holder of an airline transport pilot certificate.

Significantly, CAB, in issuing its report on the Post Watchung accident last October, blamed both the Constitution crew and the Cessna pilot. The Board said the Constitution crew failed to observe and treat the lightplane, but that the Cessna pilot, while on an assembly and in an area where a heavy concentration of traffic could be expected, failed to remain alert and avoid the transport.

Pilot and passenger aboard the Cessna were killed. None of the 21 passengers in either of the two Cessna aircraft survived, but the accident did not end catastrophically. With the Cessna's engine, propeller, leading gear and seat structure lodged in the Constitution's fuselage, the transport made an emergency landing at Mansfield Air Force Base.

▼ View Obscured—The Constitution captain saw the Cessna just before the accident but too late to avoid the crash. CAB concluded that unobstructed view as a "level plane" was not available to either pilot or copilot of the Constitution since the aircraft structure and equipment in the windshield restrict vision in certain areas.

Action against the Constitution pilots followed a formal letter of inquiry from the Aircraft Owners and Pilots Assn. last fall from AOPA and Civil Aviation Administration. D. W. Rutherford, who is head of regional CAA Field Office officials, reported to CAB that he had received a complaint against the PAA members but that the matter was "faded out" in Washington. The public pilot group asked Rutherford what he planned to do about the matter.

An L-16 Pilots Assn. will go to bat on behalf of the transport crewmen, who are expected to ask a CAB hearing on CAA's charges.

► Capital Mislay—Complaint brought by CAB against the Capital Airlines pilots was similar to the charges filed in the PAA case. The Capital crew is alleged to have failed to give way to the Cessna, which was converging from the DC-3's right.

CAB said that contrary to provisions of the Civil Av Regulation, the DC-3 was being flown over Mansfield Field at less than 1,000 ft when there was other traffic in and near the strip. It added that the crew was conscious of failing to observe sufficient vigilance to avoid collision with the Cessna, whose pilot was killed. CAB has yet put itself in its report as the Mansfield crash.

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State Loses Fight

State Airlines, Charlotte, N.C., has lost its long court fight for higher rates which the Civil Aeronautics Board had awarded to Pan American World Airways, Inc., at April 1947.

The Supreme Court, in a 6 to 2 decision, ruled that CAB can legally award rates to a company that did not apply for them specifically. State Airlines claimed it had applied for the standard rates in Ohio, Kentucky, West Virginia, Virginia and North Carolina which were awarded to Pan American.

Lawsuit Continues—Lost April, the U.S. Court of Appeals for the District of Columbia upheld State's claim that CAB had no power to grant rates to companies that did not specifically request them. The lower court had said that 30 points Pan American asked to name, only nine were on the routes finally awarded to Pan American by CAB Arbitrarily, the lower court declared the rates granted Pan American closely paralleled the system applied for State Airlines.

While Pan American did not ask for all the routes overflown, the company included in its application a "catch-all" clause agreeing to whatever establishes CAB might choose to make. Pan American has been operating its local system since February, 1948.

SHORTLINES

■ **Air Express-Signments totalled 54 million last year, down 12 percent from 1945. Weight of shipments in 1949 aggregated 1,000,000,000 lbs. Total gross revenue amounted \$472.2 million. Average weight of pieces last year was 25.2 lbs., and the average charge per shipment was \$4.80.**

■ **Air France—Has signed maintenance programs and cargo agreements with Airone and American Overseas Airlines.**

■ **American—Last year flew a record 3,353,761 passengers, 1,505,460,673 package miles, a gain of 16 percent over 1948. Average load factor rose from 68.4 percent in 1948 to 64.6 percent in 1949. Miles revenue gained 10 percent, totaling \$487,705,205 million. Total revenue fell 1.2 percent, totaling up 1 percent, and freight \$4,591,673 million, a 4.1 percent increase over 1948. Cargo revenue during the year averaged over \$500,000 monthly.**

■ **Capital—Has signed an air route cargo agreement with Skiat Airways. Certain transfer points will be Chicago, where they will share the same terminal facilities and coordinate their schedules. Perhaps at the point is a provision that each company will receive 5 percent of the revenue gained by shipments on flights carried on by each other.**

■ **Civil Aviation Board—With an eye to the future, the agency announced use of its technical staff to attend an Air Force seminar on operations and maintenance of jet aircraft. More than 40 jet experts are invited.**

■ **Delta—Reports a \$708,167 operating profit and \$493,367 net profit also taxes in 1948, compared with \$845,628 net income in 1947. Passenger traffic gained 5 percent and freight 23 percent over 1947, both setting new records.**

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■ **Pan American—Reports revenue percentage rates last gained 4 percent over 1948 and end two miles**

jumped 20 percent. Cargo traffic fell 14.4% in 1948.

■ **Pan American—Has signed an interline cargo agreement with the Flying Tiger Line.**

■ **Pan Flight, Inc.—Has been denied a CAB exemption to engage in special air charter service between Worcester-Coast Airport, White Plains, N.Y., and northern western areas.**

■ **Pan-Canadian—Has announced a proposed ticket purchase plan. Testflight certificates in all 500 denominations are issued at all TCA offices and valid 2 percent discount when applied to the purchase of an ticket. Certificates can be cashed at five cities without limitation at any time.**

■ **Tamiami—Giddily transported \$45.9 million in Thielert government gold from Japan to the U.S.**

■ **TWA—Has agreed to lease its Boeing Stratoliner by July 1.**

■ **Twa—Has been granted 60 routes a week on temporary mail pay for DC-3 operations until June 30 and 93 routes a week thereafter. Company will get 40 cents a plane mile for feeder operations with single-engine Douglas B-23 equipment until June 30, 35 cents between July 1 and Sept. 30, 30 cents between Oct. 1 and Dec. 31, and 25 cents thereafter.**

CAB SCHEDULE

Feb. 10—Hearing on Illinois air lines and National Airlines' former exemption claim. (Docket 4419)

Feb. 10—Hearing on TWA's route application for New York City.

Feb. 10—Hearing on California Airlines' application for San Francisco to Los Angeles via the Santa Monica (Docket 4421) and Miami (Docket 4422).

Feb. 10—Hearing on TWA's application for New York City-Minneapolis-Toronto via eastern panhandle (Docket 4423).

Feb. 10—Hearing on Eastern Airlines route rate case. (Docket 4424).

Feb. 10—Hearing on TWA's application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4425).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4426).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4427).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4428).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4429).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4430).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4431).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4432).

Feb. 10—Hearing on TWA's route rate application for New York City-Baltimore via New York, Newark, Philadelphia, Washington, and Pittsburgh (Docket 4433).

AVIATION WEEK, February 13, 1950



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EDITORIAL

Allison Goes and Does It

General Motors Corporation's Allison division comes up with the bold decision to buy a commercial Convair Liner, install two Allison T-38 turboprop engines, and test them thoroughly. Amazing! What's more from Washington reports Floyd Odlum's Consolidated-Vultee Aircraft Corp. is contributing \$320,000 in engineering work. GMC's Aeroproducts division will furnish propellers.

This is a significant evolution in our aviation history. It is a happy event to those who were abounding all hope for a leading role by the free enterprise system in jet or turboprop development in this country. It means we're finally off these caterer and underdog.

Allison is purchasing the transport with its own money. No loan from Washington. No Federal strings attached. Presumably it will make the tools at its own expense, and in its own way. No bureaucratic slowdowns. We assume the objective is to prove the value of its engines and promote their use for both military and commercial use.

The decision will give that country its first, long-awaited turbine-powered transport, and open the way to commercial orders for transport plane manufacturers. Highly successful tests must spur military interest and exert the influence of public opinion on high government officials who have been so cold to the importance of a modern turbine powered transport fleet in our national defense.

Allison's decision makes pleasant reading after all of the segments we have heard that industry can only lease such planes, or pay for government financing because of the "probabilistic" costs involved.

It is especially pleasant reading so soon after it became known that the Budget Bureau—which means the White House—had rejected a USAF proposal to finance four jet and cargo prototype planes.

Now Allison and General Motors have decided to stick their necks out. It is unnecessary but inspiring, nevertheless, to point out that General Motors Corporation epitomizes America. "Big Business," the big bad wolf that is constantly being spouted at us so much, vanquished and slain by those steppes at free enterprise.

Defenders of the General Motors type of business organization repeatedly have contended that a giant company depends upon its size and resources to launch and accomplish pioneering developments that benefit the country and its people.

Now, that admittedly is only the first step. It certainly convinces Allison and General Motors to nothing more than this. But up to now who in industry has had the courage to go that far?

Someone must start the ball rolling. It is gratifying that this time it is business—not a bureau or a politically appointed committee—that is taking the initiative. It is also gratifying that it is one of America's industrial giants that is doing it.

At least two major companies are unwilling to sit back any longer and wait for "Uncle Sam" to tackle this first job for us.

We forecast that successful tests will inevitably force the White House, the Budget Bureau, and the National Defense Establishment to execute a sort tomahawk on their present cold and clammy attitude toward turbine transport development.

A big hand to Allison and GMC, and to Convair for a strong assist.

Woolworth or Tiffany?

If we can judge from a few of the arguments we still read against fewer air lines on air coaches we gather that some air executives have not brushed up recently on their American transportation history.

The future too often is still being judged by the past. The past proves that the easier we make it to travel, the more Americans will move. You simply cannot seriously advocate a static percentage of the national income in travel expenditure. Nor can air transportation intelligently estimate that it will continue to win only a slightly increasing fraction of the total travel dollar in competition with other transportation needs.

Air transportation can persuade millions who already travel to take to the air. More important, it can persuade other millions who travel little or none to get aboard by air.

From the long range point of view, air transport must make plans for getting millions to fly. Because those few passengers we now are worrying so much about being "diverted" from standard to coach service are small potatoes in comparison with the millions who have never flown at all, and won't until we make it easy and inexpensive for them to do so.

The automobile made it easy and economical to travel. Americans spent every minute anybody ever made in those early horseless carriage days and afterward the world with our mobility.

Let's quit hunting our fathers by our past. Take off the blindfold and pick up the binoculars. There are millions of Americans who have never flown. They are our new customers. Air transportation can never expand in the right direction and efficiency until it captures them. But it will take Woodward's principles to do it, not Tiffany's.

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